

### ABSTRACT

A tetragonal lattice is formed by first cylindrical structural members, and a photonic crystal has a periodical structure formed by a periodical arrangement of such tetragonal lattice. A distance between center points of the first cylindrical structural members is taken as a unit length  $a$ , which constitutes a lattice constant of the tetragonal lattice. At an approximate center of the tetragonal lattice, a second cylindrical structural member is provided, and a dielectric area is provided around the first cylindrical structural members and the second cylindrical structural member. This structure allows the formation of a photonic band gap for a TE wave and a photonic band gap for a TM wave in a certain common frequency region, thereby forming a complete band gap.